REMARKS:

Claims 1-17 and 22-26 are currently pending in the application. Claims 1, 4-9, 12-17, and 23 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Jensen. Claims 1, 4, 9, 12, 17, and 23 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Buivid. Claims 22 and 24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Larsen. Claims 2, 3, 10, and 11 stand rejected under 35 U.S.C. § 103(a) as being obvious over either Jensen or Buivid in view of Noehren. Claim 25 stands rejected under 35 U.S.C. § 103(a) as being obvious over Larsen in view of either Buivid or Jensen. Claim 26 is allowed.

By making these amendments, the Applicants make no admission concerning the merits of the Examiner's rejection, and respectfully reserve the right to address any statement or averment of the Examiner not specifically addressed in this response. Particularly, the Applicants reserve the right to file additional claims in the Application or through a continuation patent application of substantially the same scope of originally filed Claims 1-17 and 22-26.

Rejections Under 35 U.S.C. § 102(b):

Claims 1, 4-9, 12-17, and 23 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Jensen.

With regard to Claims 1, 4-9, 12-17, and 23, the Examiner states that Jensen discloses all claimed parts. Jensen discloses a rotary-wing aircraft having blades pivotally connected to a rotor hub, allowing for movement of the blades in the plane of motion. This lead/lag motion is controlled by a switchable damper having a piston 108 within a cylindrical element 106, the piston having a restricted passage 146 therethrough for allowing fluid to pass between chambers 110, 112. Piston 108 also has spring-biased relief valves 148 and 150 for relieving excessive pressure. In addition, the damper has a bypass conduit 152 for connecting chambers 110, 112. A solenoid valve 154 is located in conduit 152, valve 154 being electrically switchable between two damping rates by movement of a valve member 160 between open and closed positions. Valve member

160 is spring biased toward the closed position, in which the damper has a high damping rate, and is opened when solenoid valve 154 is energized, providing a lower damping rate. Valve 154 is operatively connected by electrical circuits to the landing gear of the aircraft, such that solenoid valve 154 is energized when the aircraft becomes airborne and the pilot retracts the gear.

In the disclosed system, Jensen does not teach or show the use of deformable elements to provide the damper with a spring rate. The Jensen damper is a pure fluid damper, which resists motion only with the restricted flow of incompressible fluid through 146, 152. The Jensen damper provides only a damping rate.

On the other hand, the claimed invention comprises a system for damping lead/lag motion, in which deformable seals 69, 71 provide damper 59 with a spring rate and the restricted fluid flow through passages 87, 89 provide damper 59 with a damping rate. Moving rotary valve 97 between the open and closed positions allows for selection between a spring rate and associated damping rate and a second, stiffer set of spring and damping rates.

Independent Claim 1, as amended, requires a central member, a plurality of blade attachment members pivotally attached to the central member and allowing for in-plane motion of the blades relative to the central member, and "a damper operably connected to each blade attachment member for damping the in-plane motion of the associated blade, each damper being selectively switchable between at least first and second spring rates." Jensen does not show or teach the use of a damper having a spring rate and does not show or teach the use of a damper being selectively switchable between at least two spring rates.

Independent Claim 9, as amended, is directed to a soft in-plane proprotor assembly for a tiltrotor aircraft, the assembly comprising a central member, a plurality of proprotor blades, a plurality of blade attachment members pivotally attached to the central member and allowing in-plane motion of the blades relative to the central member, and "a damper operably connected to each blade attachment member for damping the in-plane motion of the associated blade, each damper being selectively switchable between at

least first and second spring rates." As discussed above for Claim 1, Jensen does not show or teach the use of a damper having a spring rate and does not show or teach the use of a damper being selectively switchable between at least two spring rates.

As amended, independent Claim 17 covers a rotor hub assembly for a rotary-wing aircraft having a central member and a plurality of blade attachment members for attaching rotor blades to the central member, the blade attachment members allowing for lead/lag in-plane motion of the blades relative to the central member. Claim 17, as amended, also requires a damper connected to an inner end of each blade attachment member for damping the in-plane motion. Each damper is described as "having valve means for controlling the flow of fluid within the damper to allow the damper to be selectively switchable between at least two spring rates and a damping rate associated with each spring rate." As discussed above, Jensen does not show or teach the use of a damper having a spring rate and does not show or teach the use of a damper being selectively switchable between at least two spring rates and associated damping rates.

Independent Claim 23, as amended, is directed to a method claim for damping in-plane motion of blades of an aircraft rotor. The method requires pivotally attaching blade attachment members to a central member, attaching a rotor blade to each blade attachment member, operably connecting each blade attachment member to a damper selectively switchable between at least two spring rates, and switching each damper to achieve a selected in-plane stiffness. Jensen does not show or teach a method of damping in-plane motion of rotor blades using a damper having a spring rate and does not show or teach a method using a damper being selectively switchable between at least two spring rates.

Claims 1, 9, 17, and 23 are hereby amended to more particularly point out and distinctly claim the subject matter that the Applicants regard as their invention. Claims 4-8 and 12-16 are not hereby amended; however, Claims 4-8 and 12-16 are dependent upon Claims 1 and 9, respectively, which are hereby amended. Accordingly, the Applicants submit that Claims 1, 4-9, 12-17, and 23, as amended, overcome the Examiner's rejection under 35 U.S.C. § 102(b) and are now in condition for allowance. Therefore, the

Applicants respectfully request that Claims 1, 4-9, 12-17, and 23, as amended, be allowed.

Claims 1, 4, 9, 12, 17, and 23 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Buivid.

With regard to Claims 1, 4, 9, 12, 17, and 23, the Examiner states that Buivid discloses all claimed parts. Buivid discloses a damper 30 for use in damping in-plane motion of rotor blades 22. Each damper 30 comprises a housing 50, a piston 52 movably carried within housing 50, and a control valve 36. One of housing 50 and piston 52 are operably connected to a pivotable blade, and the other of housing 50 and piston 52 is connected to non-movable portion of the rotor hub. As piston 50 and housing 52 move relative to each other, fluid is moved between chambers 60, 62 through pipes 64 and control valve 36. Control valve 36 comprises a housing 66 having a through passage 68, and restriction plugs 72 are located in either end of passage 68. Bypass valves have spring-biased balls 78 that engage seats 80. In addition, a port 70 connects passage 68 to a remote fluid reservoir 38. Orifices in restriction plugs 72 provide damper 30 with a selected nominal damping rate. However, overpressure within passage 68 causes balls 78 to lift from seats 80, allowing fluid to bypass restriction pugs 72. During assembly, selected springs are installed to achieve the desired overpressure requirement necessary to unseat balls 78.

In the disclosed system, Buivid does not teach or show the use of a damper having a spring rate as well as a damping rate. Also, Buivid does not teach or show a damper that is selectively switchable between spring rates. Damper 30 is a fluid damper having only a damping rate and no spring force. Damper 30 does employ a passive type of bypass that is not actively controlled, but this bypass only changes the damping rate of damper 30.

As described above, the claimed invention comprises deformable seals 69, 71, which provide damper 59 with a spring rate while restricted fluid flow through passages 87, 89 provides damper 59 with a damping rate. Damper 59 is selectively switchable

between a spring rate and associated damping rate and a second, stiffer set of spring and damping rates.

As stated above, each of independent apparatus Claims 1, 9, and 17, and independent method Claim 23 of the present application requires a damper selectively switchable between at least two spring rates, which is not shown in the Buivid reference. Claims 1, 9, 17, and 23 are hereby amended to more particularly point out and distinctly claim the subject matter that the Applicants regard as their invention. Claims 4 and 12 are not hereby amended; however, Claims 4 and 12 are dependent upon Claims 1 and 9, respectively, which are hereby amended. Accordingly, the Applicants submit that Claims 1, 4, 9, 12, 17, and 23, as amended, overcome the Examiner's rejection under 35 U.S.C. § 102(b) and are now in condition for allowance. Therefore, the Applicants respectfully request that Claims 1, 4, 9, 12, 17, and 23, as amended, be allowed.

Claims 22 and 24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Larsen.

With regard to Claims 22 and 24, the Examiner states that Larsen discloses all claimed parts. Larsen discloses an aircraft rotor having members 14 that act to attach blades to a central hub. A pivot pin 13 passes through an inboard end of each member 14 to provide for a flapping hinge. The outer end of each member 14 is "forked in a vertical plane" (col. 2, lines 28-29), creating a pair of prongs 17 that engage prongs 18 at the inboard, root end fitting 19 of each blade. "The two pairs of forks are apertured in their interengaging portions to receive a pivot 20 (col. 2, lines 32-34), which forms a lead/lag pivot for in-plane motion.

In the disclosed system, Larsen does not teach the use of a blade strap that encircles the flapping hinge and a bearing of the associated lead/lag hinge. Rather, members 14 are shown and described as having forked outer ends, a pivot 20 extending through apertures formed in each forked end.

On the other hand, the claimed invention comprises a unitary, loop-type blade strap 35 (19 in the embodiment of Figure 1) that encircles both flapping hinge 39 and elastomeric lead/lag bearing 47.

Independent Claim 22 and dependent Claim 24 are directed to a proprotor assembly for a tiltrotor aircraft, the assembly having a central member, a plurality of blade attachment members, and a plurality of blades. The assembly has a flapping hinge connecting each blade attachment member to the central member and a lead/lag hinge connecting each blade to a blade attachment member, the axes of the hinges or each blade being non-coincident. Claim 22 also requires a blade strap that encircles each flapping hinge and a bearing of the associated lead/lag hinge, each blade strap being a unitary loop.

Therefore, the Applicants respectfully submit that independent Claim 22 and dependent Claim 24 are not anticipated by Larsen and do not lack novelty under 35 U.S.C. § 102(b). Therefore, the Applicants respectfully request that Claims 22 and 24 be allowed.

Rejections Under 35 U.S.C. § 103(a):

Claims 2, 3, 10, and 11 stand rejected under 35 U.S.C. § 103(a) as being obvious over either Jensen or Buivid in view of Noehren.

The Examiner states that Claims 2, 3, 10, and 11 lack an inventive step under 35 U.S.C. § 103(a) as being obvious over Jensen or Buivid in view of Noehren. Examiner states that Jensen or Buivid disclose all claimed parts of independent Claims 1 and 9, except for the use of elastomeric bearings where the pivot axis of each blade attachment member passes through a focus of the associated bearing. The Examiner relies upon Noehren to supply the feature of elastomeric bearings through a focus of the associated bearing. The Examiner states that Noehren teaches a helicopter having rotor blades attached to a central member, via elastomeric bearings such that the pivot axis of each blade attachment member passes through a focus of the associated bearing. The Examiner also states that it would have been obvious to one skilled in the art at the time

the invention was made to form the pivot pins of Jensen or Buivid such that they are formed as elastomeric bearings such that the pivot axis of each blade attachment member passes through a focus of the associated bearing, as taught by Noehren.

However, as has been discussed above with respect to Claims 1 and 9 above, neither Jensen nor Buivid teach the use of a damper having spring rates in addition to a damping rate or of a damper being selectively switchable between spring rates. There is also no suggestion in Noehren to have a damper having spring rates or a damper selectively switchable between spring rates. Therefore, the combination of either Jensen or Buivid and Noehren would not produce a rotor hub as in the claimed invention. Thus, the claimed invention would not have been obvious to one skilled in the art at the time the invention was made.

Claims 2, 3, 10, and 11 are not hereby amended; however, Claims 2 and 3 are dependent upon Claim 1; Claims 10 and 11 are dependent upon Claim 9. Claims 1 and 9 are hereby amended. Accordingly, the Applicants submit that Claims 2, 3, 10, and 11, being dependent upon amended independent claims, overcome the Examiner's rejection under 35 U.S.C. § 103(a) and are now in condition for allowance. Therefore, the Applicants respectfully request that Claims 2, 3, 10, and 11, be allowed.

Claim 25 stands rejected under 35 U.S.C. § 103(a) as being obvious over Larsen in view of either Buivid or Jensen.

The Examiner states that dependent Claim 25 lacks an inventive step under 35 U.S.C. § 103(a) as being obvious over Larsen in view of either Buivid or Jensen. The Examiner states that Larson discloses a rotor assembly substantially as claimed, but does not disclose dampers operatively connected to each blade attachment member for damping in plane motion of each associated blade, each damper being selectively switchable between at least first and second spring rates. The Examiner also states that both Buivid and Jensen show an aircraft hub having dampers operatively connected to each blade attachment member for damping in plane motion, each damper being selectively switchable between at least first and second spring rates. The Examiner also states that it would have been obvious to one skilled in the art at the time the invention

was made to provide the rotor assembly of Larsen with the teachings of Buivid or Jensen to arrive at the claimed invention.

However, Claim 25 is directed to a proprotor assembly for a tiltrotor aircraft, the assembly having a central member, a plurality of blade attachment members, and a plurality of blades. The assembly has a flapping hinge connecting each blade attachment member to the central member and a lead/lag hinge connecting each blade to a blade attachment member, the axes of the hinges or each blade being non-coincident. The claim also requires a blade strap that encircles each flapping hinge and a bearing of the associated lead/lag hinge, each blade strap being a unitary loop. As has been discussed with respect to Claims 1 and 9 above, Claim 25 also requires a damper operably connected to each blade attachment member and switchable between at least first and second spring rates.

Larsen does not teach the use of a blade strap that encircles the flapping hinge and a bearing of the associated lead/lag hinge. Rather, members 14 are shown and described as having forked outer ends, a pivot 20 extending through apertures formed in each forked end. As has been discussed with respect to Claims 22 above, Claim 25 comprises a unitary, loop-type blade strap 35 (19 in the embodiment of Figure 1) that encircles both flapping hinge 39 and elastomeric lead/lag bearing 47.

However, as has been discussed above with respect to Claims 1 and 9 above, Neither Jensen nor Buivid teach the use of a damper having spring rates in addition to a damping rate or of a damper being selectively switchable between spring rates. There is also no suggestion in Noehren to have a damper having spring rates or a damper selectively switchable between spring rates. Therefore, Larsen in view of either Buivid or Jensen would not produce a proprotor assembly as in the claimed invention. Thus, the claimed invention would not have been obvious to one skilled in the art at the time the invention was made. Accordingly, the Applicants respectfully submit that Claim 25 does not lack an inventive step under 35 U.S.C. § 103(a) as being obvious over Larsen in view of either Buivid or Jensen. Therefore, the Applicants respectfully request that Claim 25 be allowed.

Allowed Claims:

The Applicants appreciate the Examiner's allowance of Claim 26.

CONCLUSION:

In view of the foregoing remarks, this application is considered to be in condition for allowance, and early reconsideration and a Notice of Allowance are earnestly solicited.

This Amendment is being filed via the U.S. Patent and Trademark Office's EFS-Web electronic filing system. A fee in the amount of $130.00 for the Request for Extension for Response Within the First Month is being paid concurrently with the filing of this paper via the EFS-Web electronic filing system. No fees are deemed to be necessary; however, the undersigned hereby authorizes the Commissioner to charge any fees that may be required, or credit any overpayments, to **Deposit Account No. 502806**.

Please link this application to Customer No. 38441, so that its status may be accessed via the PAIR System.

Respectfully submitted,

12/2/08
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